DRAFT Final Report.

Incidental Harassment Authorization, take by harassment small numbers of marine mammals incidental to research surveys performed for the purpose of assessing trends over time in black abalone populations at permanent study sites on San Nicolas Island, California.

Period of Authorization: 30 November 2005 through 29 November 2006.

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Background

The purpose of the authorized activity is to assess trends in black abalone populations at San Nicolas Island, Ventura County, California (33º N, 119º W), over time in permanent study sites. Population trend data for black abalone populations have become important in a conservation context because of: a) the reintroduction of sea otters to San Nicolas Island in 1987, raising the possibility of conflict between otter conservation and abalone populations (abalones are often significant prey for sea otters); b) the appearance of a novel exotic disease, abalone withering syndrome, at San Nicolas Island in 1992, resulting in dramatically increased rates of abalone mortality at the Island; and c) the recent designation of black abalones as a species of concern in the context of the Endangered Species Act of 1973 as amended, by the National Marine Fisheries Service. Research is done under the auspices of the Washington Cooperative Fish and Wildlife Research Unit (a component of the Cooperative Research Units Program, Biological Discipline, U.S. Geological Survey), the University of Washington, and the U.S. Navy (owner of San Nicolas Island), with additional logistical support from the University of California, Santa Cruz. Funding for this activity is currently provided by the U.S. Geological Survey, the California Sea Grant College Program, the Office of Protected Resources of the National Marine Fisheries Service, the College of Ocean and Fishery Sciences of the University of Washington, and the U.S. Navy.

The quantitative abalone surveys began in 1981 following reconnaissance surveys in 1979 and 1980, in anticipation of the Southern Sea Otter relocation program that began in 1987. The holder of the Incidental Harassment Authorization (the Authorization) made 106 separate field trips to San Nicolas Island from September 1979 through March 2006, with each trip averaging approximately 6 days in length. To date the holder of the

Authorization has done abalone survey work during low tides on 564 different days at nine permanent study sites on the Island. A map of study sites is attached (Figure 1). During surveys in 2002 it became clear that additional work could not be done at sites 5, 6, 7, 8, and 9 (Figure 1) without the possibility of incidental harassment of pinniped populations hauled out at or near the study locations. It was recognized that there was also a slight possibility of incidental harassment of hauled pinnipeds at site 1. Subject marine mammal populations (especially California sea lions and northern elephant seals) at San Nicolas Island have grown substantially since the beginning of abalone research in 1979, and have occupied an expanded distribution at San Nicolas Island in association with population growth. Thus, sites previously accessible with no risk of marine mammal harassment are now being utilized by marine mammals at levels such that approach to the sites without pinniped harassment is no longer possible.

Research is conducted by counting abalones in plots of 1 m^2 along permanent transect lines in rocky intertidal habitats at each of the nine study sites at San Nicolas Island. Permanent transect lines are demarcated by stainless steel eyebolts embedded in the rocky habitat and secured with marine epoxy compound. Lines are placed temporarily between bolts during surveys and are removed once surveys are completed. Survey work is done by two field biologists working on foot. Additional methodological detail is available in VanBlaricom 1993 and VanBlaricom et al. 1993.

Monitoring of black abalone populations at San Nicolas Island can be done only during periods of extreme low tides. The exact date of a visit to any given site is difficult to predict because variation in surf height and sea conditions can influence the safety of field biologists as well as the quality of the data collected. In most years survey work is done during the months of January, February, March, July, November, and December because of optimal availability of low tides. All work is done only during daylight hours because of safety considerations. Sites 5, 6, 7, and 8 are avoided from February through October to avoid any risk of disturbance to newborn dependent pups of harbor seals and California sea lions. Because site 8 is avoided during summer months, it is the opinion of the applicant that the risk of taking of Guadalupe fur seals by incidental harassment during abalone research is nil. Northern elephant seal pups are present at the subject sites during winter months, but all age and sex categories of this species can be easily avoided without harassment. Site 1 is sometimes occupied by small numbers of California sea lions, but to date all individuals observed near site one are juveniles or adult males, and we have not observed any evidence of pupping by sea lions near site 1.

Given the above, the months of November, December, and January generally are preferable for survey work in the context of minimizing the risk of incidental harassment of marine mammals. However, survey work from November through January may be interrupted more frequently than survey work in other months by large waves resulting from winter storms. In some cases during winter, waves may be large enough to compromise the safety of abalone survey personnel, requiring delays in survey work.

Resulting data likely will be accepted for publication in a refereed scientific journal, because resulting data are likely to contribute to the resolution of a conservation problem.

Two papers have already been published from this study based on data collected in previous years (see reference section). Future publications in refereed scientific journals are quite likely. There is concern that the combined effects of sea otter predation and abalone withering syndrome, following on several decades during which black abalones may have been over-harvested in commercial and recreational fisheries, may cause reduction of black abalone populations to the point where risk of extinction increases. The long-term abalone population trend data from San Nicolas Island will be crucial in determining if drastic population declines continue, and if extinction risk becomes high.

Record of disturbance during the period of authorized field activity

The subject Authorization was issued on 29 November 2005, with an indicated expiration date of 28 November 2006. A copy of the Authorization is attached (attachment 1). This Draft Final Report is submitted now (4 August 2006) because further field work within the period of authorization is not anticipated.

Five field trips to San Nicolas Island were made during the period of authorization, for purposes of field work on black abalone populations as specified above. Timing of site visits was determined by predicted tidal levels and by conditions of weather and sea as indicated above. Dates of field work were as follows:

1-4 December 2005
29 December 2005-2 January 2006
12-16 January 2006
25-31 January 2006
24 February-1 March 2006

Counts of marine mammals present at study sites were made at the beginning of each site visit by scanning the area with Leica® 10x42 trinovid binoculars at a safe distance (i.e., far enough from the study site to avoid any take by incidental disturbance). Counts included the total number of hauled marine mammals present by species. Once counts were completed and recorded, we made the most cautious possible approaches to the study sites, with minimization of incidental take by harassment as the first priority. Numbers of animals disturbed were enumerated with frequent binocular scans during approach. Running counts of disturbed animals were made until arrival on the study site, at which time running counts were totaled and recorded. We made additional counts of newly disturbed animals each time it was necessary to change location within the study site proper. New counts of disturbed animals were added to those recorded during initial approach to the study areas. In all cases, we grouped counts of disturbed animals into three categories relating to level of disturbance (i.e., flushed into the water, moved > 1 m but did not enter the water, became alert but did not move), as indicated in tables 1, 2, and 3.

The following three species of marine mammal were taken by incidental harassment during the five field trips indicated above:

Zalophus californianus (Lesson, 1828): California sea lion
Phoca vitulina Linnaeus, 1758: Pacific harbor seal
Mirounga angustirostris (Gill, 1866): Northern elephant seal

Numbers, locations, and dates of taking are indicated for the three species taken in Tables 1, 2, and 3, respectively. At no time during field work did we take by harassment any marine mammal that was nursing or accompanied by a pup. Adult female northern elephant seals were sometime observed with nursing pups within our study sites. However, in all cases we were able to avoid taking the mothers and their pups by incidental harassment, simply by making cautious and considered approaches to the study sites.

We disturbed no harbor seal or northern elephant seal pups during our survey work. We disturbed a total of 118 California sea lion pups during the survey work (11% of the total of 1045 California sea lions disturbed by our activities during the Authorization period; Table 1). None of the disturbed sea lion pups were observed to be nursing at the time of the disturbances. In contrast to the case with harbor seals or northern elephant seals, we found it consistently difficult to discern pup of the year California sea lions from older juvenile sea lion pups, particularly for animals viewed from distances of 50 m or more.

At no time during field work did our activities result in the taking by serious injury or death of any species of marine mammal. In addition, our activities did not result in the taking of any species of marine mammal in a manner prohibited by the Authorization.

As indicated in Tables 1, 2, and 3, California sea lions were the most abundant marine mammal species observed at our study sites on San Nicolas Island. Northern elephant seals were second most abundant, and Pacific harbor seals least abundant in the study sites. Pacific harbor seals (88%) appear to have been the most readily disturbed of the species observed, with California sea lions (67%) second most susceptible (Tables 1 & 2). Northern elephant seals were least subject to disturbance (2%, Table 3), as expected.

Observations of other species

We made careful searches of study areas using binocular scans, on approach but from safe distances, for other species of marine mammals present in study areas visited. We observed no Guadalupe fur seals (*Arctocephalus townsendi* Merriam, 1897), sea otters (*Enhydra lutris* [Linnaeus, 1758]), or any other species of marine mammal during our field work. Takes by incidental harassment were limited to California sea lions, Pacific harbor seals, and northern elephant seals.

Coordination with other organizations

As specified in the IHA, we communicated with representatives of the Environmental Planning and Management Department (EPMD) of the U.S. Navy, Hubbs-Sea World Research Institute (HSWRI), and the Southwest Fisheries Science Center (SWFSC) of the National Marine Fisheries Service, prior to and during our field work. In consultation with HSWRI and SWFSC prior to commencement of field work, it was determined that no interference to pinniped research work at San Nicolas Island would result from our work at the permanent abalone study sites. During the course of field work we were in regular contact with EPMD staff, providing information on details of research activities, and on occasional observations of tagged pinnipeds as directed in the IHA. We were able to complete our field work without interference to U.S. Naval operations at the Island, and without disturbance to other natural resources of conservation concern at the Island.

References

VanBlaricom, G.R. 1993. Dynamics and distribution of black abalone populations at San Nicolas Island. Pages 323-334 *in* F.G. Hochberg (editor). Third California Islands Symposium: Recent Advances in research on the California Islands. Santa Barbara Museum of Natural History, Santa Barbara, California.

VanBlaricom, G.R., J.L. Ruediger, C.S. Friedman, D.D. Woodard, and R.P. Hedrick. 1993. Discovery of withering syndrome among black abalone populations at San Nicolas Island, California. *Journal of Shellfish Research* 12: 185-188.

Table 1. Zalophus californianus

Year	Month	Day	Site	Zalophus present	Total Zalophus disturbed	Flushed into water	Moved >1 m, but did not enter water	Became alert, but did not move >1m	Pups disturbed*
2005	December	1	2	0	0	0	0	0	0
2005	December	2	3	0	0	0	0	0	0
2005	December	3	2	0	0	0	0	0	0
2005	December	4	4	0	0	0	0	0	0
2005	December	29	9	0	0	0	0	0	0
2005	December	30	8	226	195	43 (0 pups)	101 (13 pups)	51 (12 pups)	25
2005	December	31	9	0	0	0	0	0	0
2006	January	1	2	0	0	0	0	0	0
2006	January	2	1	54	1	0	1 (0 pups)	0	0
2006	January	12	1	50	3	1 (0 pups)	2 (0 pups)	0	0
2006	January	13	8	241	227	14 (0 pups)	208 (18 pups)	5 (1 pup)	19
2006	January	14	6	86	69	13 (0 pups)	52 (10 pups)	4 (0 pups)	10
2006	January	15	2	0	0	0	0	0	0
2006	January	16	3	0	0	0	0	0	0
2006	January	25	4	0	0	0	0	0	0
2006	January	26	5	27	5	5(0 pups)	0	0	0
2006	January	26	6	97	90	23 (0 pups)	53 (6 pups)	14 (3 pups)	9
2006	January	27	7	610	386	110 (0 pups)	211 (32 pups)	65 19 pups)	51
2006	January	28	8	140	40	8 (0 pups)	27 (4 pups)	5 (0 pups)	4
2006	January	29	2	0	0	0	0	0	0
2006	January	30	3	0	0	0	0	0	0
2006	January	30	4	0	0	0	0	0	0
2006	January	31	3	0	0	0	0	0	0
2006	February	24	2	0	0	0	0	0	0
2006	February	25	1	1	1	0	1 (0 pups)	0	0
2006	February	26	1	32	28	4 (0 pups)	24 (0 pups)	0	0
2006	February	27		no field work					
2006	February	28	3	0	0	0	0	0	0
2006	March	1	4	0	0	0	0	0	0
	Totals			1564	1045	221 (0 pups)	680	144	118

***During winter, pups of the year may be difficult to distinguish from older pre-reproductive California sea lions**

Table 2. Phoca vitulina				Phoca	Total Phoca	Flushed	Moved >1 m but	Became alert but	Pups
Year	Month	Day	Site	present	disturbed	into water	did not enter water	did not move >1m	disturbed
2005	December	1	2	0	0	0	0	0	0
2005	December	2	3	0	0	0	0	0	0
2005	December	3	2	0	0	0	0	0	0
2005	December	4	4	0	0	0	0	0	0
2005	December	29	9	0	0	0	0	0	0
2005	December	30	8	0	0	0	0	0	0
2005	December	31	9	0	0	0	0	0	0
2006	January	1	2	0	0	0	0	0	0
2006	January	2	1	0	0	0	0	0	0
2006	January	12	1	0	0	0	0	0	0
2006	January	13	8	0	0	0	0	0	0
2006	January	14	6	13	13	13	0	0	0
2006	January	15	2	0	0	0	0	0	0
2006	January	16	3	0	0	0	0	0	0
2006	January	25	4	0	0	0	0	0	0
2006	January	26	5	27	25	23	2	0	0
2006	January	26	6	17	12	10	1	1	0
2006	January	27	7	0	0	0	0	0	0
2006	January	28	8	0	0	0	0	0	0
2006	January	29	2	0	0	0	0	0	0
2006	January	30	3	0	0	0	0	0	0
2006	January	30	4	0	0	0	0	0	0
2006	January	31	3	0	0	0	0	0	0
2006	February	24	2	0	0	0	0	0	0
2006	February	25	1	0	0	0	0	0	0
2006	February	26	1	0	0	0	0	0	0
2006	February	27		no field work					
2006	February	28	3	0	0	0	0	0	0
2006	March	1	4	0	0	0	0	0	0
Totals				57	50	46	3	1	0

Table 3. Mirounga angustirostris

Year	Month	Day	Site	Mirounga present	Total Mirounga disturbed	Flushed into water	Moved >1 m but did not enter water	Became alert but did not move > 1 m	Pups disturbed
2005	December	1	2	0	0	0	0	0	0
2005	December	2	3	0	0	0	0	0	0
2005	December	3	2	0	0	0	0	0	0
2005	December	4	4	0	0	0	0	0	0
2005	December	29	9	14	1	0	0	1	0
2005	December	30	8	3	0	0	0	0	0
2005	December	31	9	19	0	0	0	0	0
2006	January	1	2	0	0	0	0	0	0
2006	January	2	1	0	0	0	0	0	0
2006	January	12	1	1	0	0	0	0	0
2006	January	13	8	5	0	0	0	0	0
2006	January	14	6	216	7	0	1	6	0
2006	January	15	2	0	0	0	0	0	0
2006	January	16	3	0	0	0	0	0	0
2006	January	25	4	0	0	0	0	0	0
2006	January	26	5	88	4	0	1	3	0
2006	January	26	6	203	2	0	1	1	0
2006	January	27	7	60	0	0	0	0	0
2006	January	28	8	14	0	0	0	0	0
2006	January	29	2	0	0	0	0	0	0
2006	January	30	3	0	0	0	0	0	0
2006	January	30	4	0	0	0	0	0	0
2006	January	31	3	0	0	0	0	0	0
2006	February	24	2	0	0	0	0	0	0
2006	February	25	1	0	0	0	0	0	0
2006	February	26	1	0	0	0	0	0	0
2006	February	27		no field work					
2006	February	28	3	0	0	0	0	0	0
2006	March	1	4	0	0	0	0	0	0
Totals				**623**	**14**	**0**	**3**	**11**	**0**